WE CLAIM:

1.   A method for connecting via a public network at least two privately addressed networks sharing a reserved address space, said method comprising the steps of:

automatically assigning respective unique addresses from said reserved address space to each of said at least two privately addressed networks; and

automatically routing communications between said at least two privately addressed networks dependent on said unique addresses via a virtual network link.

2.   The method of claim 1, wherein said communications are automatically routed without network address translation at a gateway of either of said at least two privately addressed networks.

3.   The method of claim 1, wherein said unique addresses are automatically assigned and said communications are automatically routed without human intervention.

4.   The method of claim 1, wherein said public network comprises the Internet and said unique addresses comprise unique Internet Protocol (IP) subnet prefixes assigned to each of said at least two privately addressed networks.

5.   The method of claim 1, comprising the further step of automatically creating said virtual network link between said at least two privately addressed networks.

6.   The method of claim 5, wherein said unique addresses are assigned prior to creating said virtual network link.

7.   The method of claim 5, wherein said virtual network link comprises a tunnel through the Internet.

8.   The method of claim 5, wherein said automatically creating step

5   comprises the sub-steps of:

automatically comparing the addresses of said at least two privately addressed networks, said addresses further comprising addresses of any other privately addressed networks connected by existing virtual network links to said at least two privately addressed

10   networks; and

automatically creating said virtual network link between said at least two privately addressed networks if no address conflict is detected in said comparing step.

15   9.   The method of claim 8, further comprising the steps of:

automatically assigning a different address to one of said at least two privately addressed networks if an address conflict is detected in said comparing step; and

automatically creating said virtual network link between said at

20   least two privately addressed networks if no address conflict is detected between said different address and the addresses of the other of said at least two privately addressed networks, and no address conflict is detected between said different address and the addresses of any other privately addressed networks connected by existing virtual network

25   links to the other of said at least two privately addressed networks.

10.   A method for automatically routing communications between privately addressed networks via a virtual network link, said method comprising the steps of:

30   automatically creating at least one virtual network link between said privately addressed networks for routing communications;

automatically assigning respective unique addresses from a reserved address space common to said privately addressed networks to devices connected to said privately addressed networks; and

automatically routing communications between said privately addressed networks dependent on said unique addresses via said at least one virtual network link.

11.   The method of claim 9, comprising the further step of automatically collaborating between said privately addressed networks to detect addresses already assigned.

12.   An apparatus for connecting via a public network at least two privately addressed networks sharing a reserved address space, said apparatus comprising:

at least one communications interface for transmitting and receiving data;

a storage unit for storing data and instructions to be performed by a processing unit; and

a processing unit coupled to said at least one communications interface and said storage unit, said processing unit programmed to:

automatically assign respective unique addresses from said reserved address space to each of said at least two privately addressed networks; and

automatically route communications between said at least two privately addressed networks dependent on said unique addresses via a virtual network link.

13.   The apparatus of claim 12, wherein said public network comprises the Internet and said processing unit is programmed to automatically assign unique Internet Protocol (IP) subnet prefixes to each of said privately addressed networks.

14.   The apparatus of claim 11, wherein said processing unit is programmed to automatically route said communications without network address translation at a gateway of either of said two privately addressed networks.

5

15.   The apparatus of claim 12, wherein said processing unit is further programmed to automatically create said virtual network link between said at least two privately addressed networks.

10

16.   The apparatus of claim 15, wherein said virtual network link comprises a tunnel through the Internet.

17.   The apparatus of claim 15, wherein said processing unit is programmed to:

15

automatically compare the addresses of said at least two privately addressed networks, each of said addresses further comprising addresses of any other privately addressed networks connected by existing virtual network links to said at least two privately addressed networks; and

20

automatically create said virtual network link between said at least two privately addressed networks if no address conflict was detected when said addresses were compared.

18.   The apparatus of claim 17, wherein said processing unit is
25   programmed to:

automatically assign a different address to one of said at least two privately addressed networks if an address conflict was detected when said addresses were compared; and

automatically create said virtual network link between said at
30   least two privately addressed networks if no address conflict is detected between said different address and the addresses of the other of said at least two privately addressed networks, and no address conflict is

detected between said different address and the addresses of any other privately addressed networks connected by existing virtual network links to the other of said at least two privately addressed networks.

19.   The apparatus of claim 12, wherein said apparatus comprises a network gateway device.

20.   The apparatus of claim 19, further comprising a Dynamic Host Configuration Protocol (DHCP) server.